

FIFTH INTERNATIONAL CONGRESS OF BIORHEOLOGY
SYMPOSIUM ON THEORETICAL CONSIDERATIONS IN BIORHEOLOGY

INTRODUCTION

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In a letter of July last year I was invited by Professor S. Witte, Chairman of the Fifth International Congress on Biorheology, to organize and to moderate a symposium on "Theoretical Considerations in Biorheology"; the choice of the individual speakers being left in my hands. So I decided to choose, among five speakers, three from the area of hemorrheology and two from other area of biorheology.

I wrote a letter of invitation to each of five outstanding investigators who are present here. It is a great pleasure to express my gratitude to these investigators for giving me a ready consent. I believe that the idea of Professor Witte to hold such a symposium is really timely and significant.

First of all, I would like to emphasize the significance of theoretical considerations in natural science in general. As is well-known, the research in natural science starts from observations and experiments, leading to discovery of various laws. It then becomes possible to draw a new conclusion solely by means of deduction from these laws. This procedure is just what is meant by theoretical considerations. Theoretical considerations enable us not only to clarify the relations between phenomena and to understand the results of experiments, but also to predict unknown phenomena. When the prediction is verified, our knowledge becomes firmer. It is obvious that both experiment and theory are indispensable to the development of natural science. The cooperation between experiment and theory enables the progress of science just like the two wheels of a cart.

As is well-known, numerous biological systems or materials are accompanied by deformation and flow. This is what is dealt with in our science, biorheology. The cooperation between experiment and theoretical considerations is also essential to the development of biorheology.

Each speaker of the symposium will give a lecture on an up-to-date topic out of modern biorheology. It may be observed that the characteristic feature of modern biorheology lay stress on a cellular or molecular point. Now let us introduce the speakers to you.

The first speaker is Professor Quemada at Laboratory of Biorheology and Physico-chemical Hydrodynamics, University Paris, France. He will talk on a unified model of steady and transient viscosity of biofluids. Shear-thinning behavior, dilatancy, and thixotropy will be discussed in relation to the structure of biofluids.

The second paper is given by Drs. Hennenberg and Silberberg at Polymer Department, Weizmann Institute of Science, Israel on kinetorheological aspects of biorheology.

Following three papers are concerned with red blood cells. Drs. Niimi and Sugihara of National Cardiovascular Center Research Institute, Japan deal with hemorheological approach to oxygen transport between blood and tissue.

The fourth speaker is Professor Skalak, at Bioengineering Institute, Department of Civil Engineering and Engineering Mechanics, Columbia University, U.S.A. The aggregation and disaggregation of red blood cells will be discussed.

The last speaker is Dr. Lerche at Abteilung der Haemorheologie und Haemodynamik, Institut für medizinische Physik und Biophysik, Humboldt-Universität, German Dem.Rep. The electrostatic charge distribution in the RBC-glycocalyx and their influence upon the interaction energy will be discussed.